

Description of *Helicoverpa sugii* sp. nov. (Lepidoptera, Noctuidae, Heliothinae) from the Ogasawara (Bonin) Islands, Japan, with brief biological notes

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Abstract *Helicoverpa sugii* Yoshimatsu sp. nov. is described from the Ogasawara Islands, Japan. Biological notes are also given with illustrations of immature stages.

Key words *Helicoverpa sugii* sp. nov., Noctuidae, Heliothinae, Ogasawara, Japan, immature stages.

Introduction

In his 1999 revision of the heliothine moths of Australia, Matthews recorded the following information. *Helicoverpa* is distributed throughout the tropical and warm-temperate regions of the world. There are 20 described species, including some with very large geographical ranges and others which are isolated, oceanic island endemics. The monophyly of *Helicoverpa* is strongly supported by structural and molecular evidence. The best structural synapomorphies are the long, coiled vesica with a stripe of cornuti along its length, and the thickened, “leathery” appendix bursae in the female.

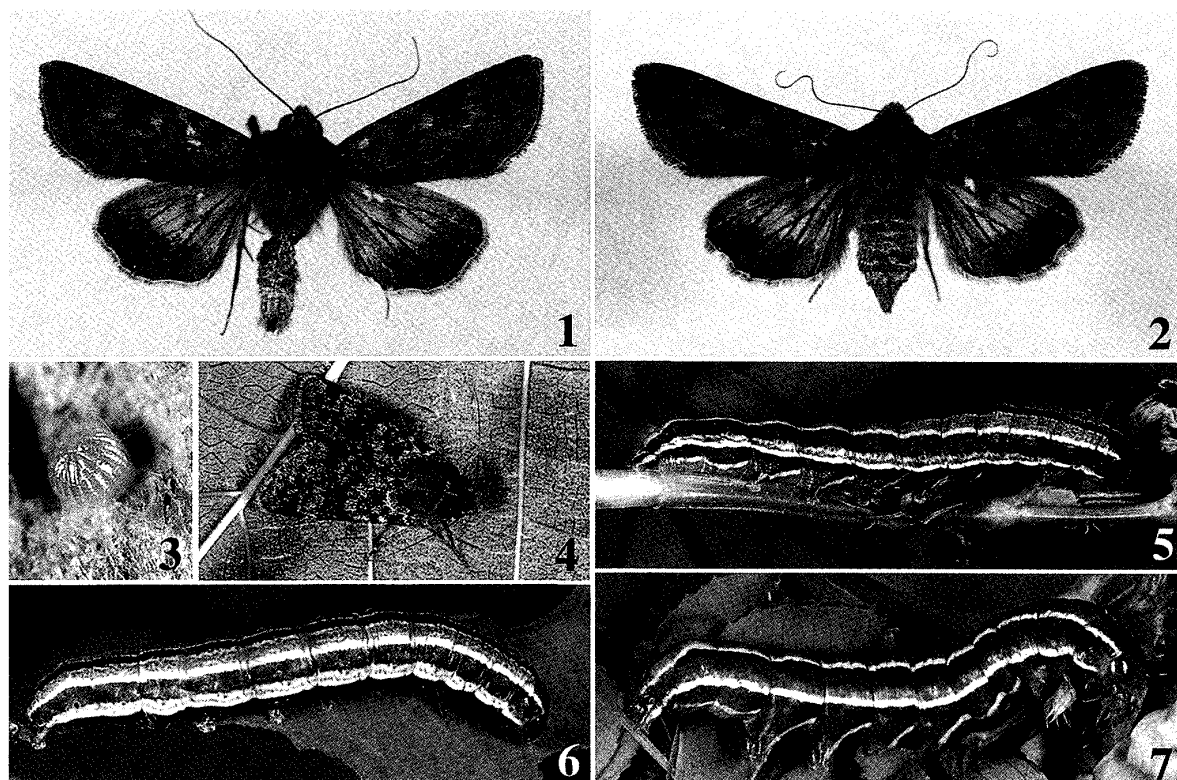
Nine species of heliothine moths have been recorded from Japan up to the present, and two of them are members of the genus *Helicoverpa*. They are *H. assulta* (Guenée, 1852) and *H. armigera* (Hübner, 1809), both well known pests of vegetables. However, an unidentified *Helicoverpa* was recorded from the Ogasawara Is (Yanagita & Nakajima, 1999), and we have examined a long series of specimens of this species from the same islands. Most adults of the genus *Helicoverpa* have yellow or brown forewings. However, the Australian *Helicoverpa prepodes* (Common, 1985) possesses gray forewings and the *Helicoverpa* sp. from Ogasawara has fuscous forewings. Black forms sometimes occur in *H. armigera* and *H. punctigera* (Wallengren, 1860). But the *Helicoverpa* sp. of Ogasawara differs from these congeners with gray or fuscous forewings in the male and female genitalia, and it is considered to be a new species. In this paper, we describe it and illustrate its immature stages for the first time.

Abbreviations used are NIAES: National Institute for Agro-Environmental Sciences, Tsukuba, and OSBTMAES: Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experimental Station, Chichi-jima.

Descriptions

Helicoverpa sugii Yoshimatsu, sp. nov. (Figs 1–9)

Helicoverpa sp.: Yanagita & Nakajima, 1999, *Trans. lepid. Soc. Japan* **50**: 67, fig. 21a, b.



Figs 1-7. Adults and immature stages of *Helicoverpa sugii* Yoshimatsu, sp. nov. 1. Male, holotype. 2. Female, paratype. 3. Egg. 4. Resting posture of adult. 5-7. Color variations of last instar larvae.

Male (Fig. 1). Length of forewing 13.0-15.4 mm.

Frons and vertex fuscous mixed with white. Thorax fuscous mixed with white. Forewing fuscous; subbasal line oblique, gray, rimmed inside with a dark black line; antemedial line waved, gray; orbicular represented by a gray spot; postmedial line dark black; terminal line represented by fuscous spots on interspaces; cilia fuscous mixed with gray. Underside of forewing dark gray, with a large fuscous costal spot; postmedial line broad, fuscous; terminal line represented by fuscous spots on interspaces; cilia fuscous mixed with gray. Hindwing ochreous white slightly tinged with fuscous, with fuscous outer half; the veins fuscous; cilia ochreous white with a fuscous transverse band in the middle. Underside of hindwing dusky gray with fuscous outer half below vein 6; discoidal spot fuscous; postmedial line fuscous; terminal line represented by fuscous spots on interspaces above vein 2; cilia almost ochreous white.

Female (Fig. 2). Length of forewing 13.2-15.6 mm. Similar to male.

Male genitalia (Fig. 8). Valva broad at the middle and narrow basally and near apical portion. Cucullus with coronal spines at and near margin. Juxta rectangular. Phallus acute distally. Vesica coiled nearly six or seven times, with three prominent diverticula near basal portion. Cornuti represented by eight bunches of spines on basal half of vesica and by five or six bunches of spines on distal 1/4, each bunch except the terminal one usually with three or four spines, the portion of vesica from 1/2 to 1/4 often bearing a single spine separately.

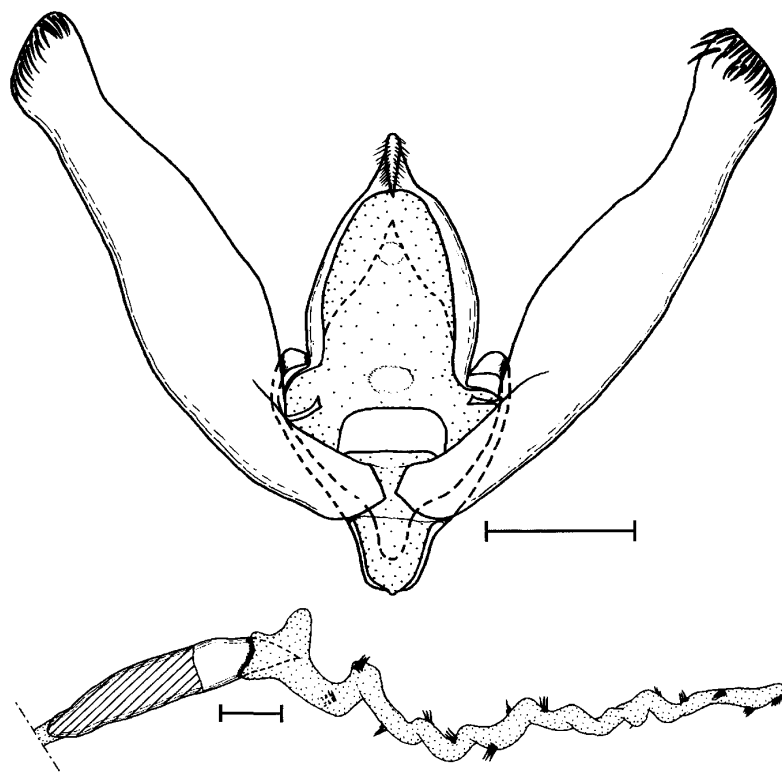


Fig. 8. Male genitalia of *Helicoverpa sugii* Yoshimatsu, sp. nov. Scales 1 mm.

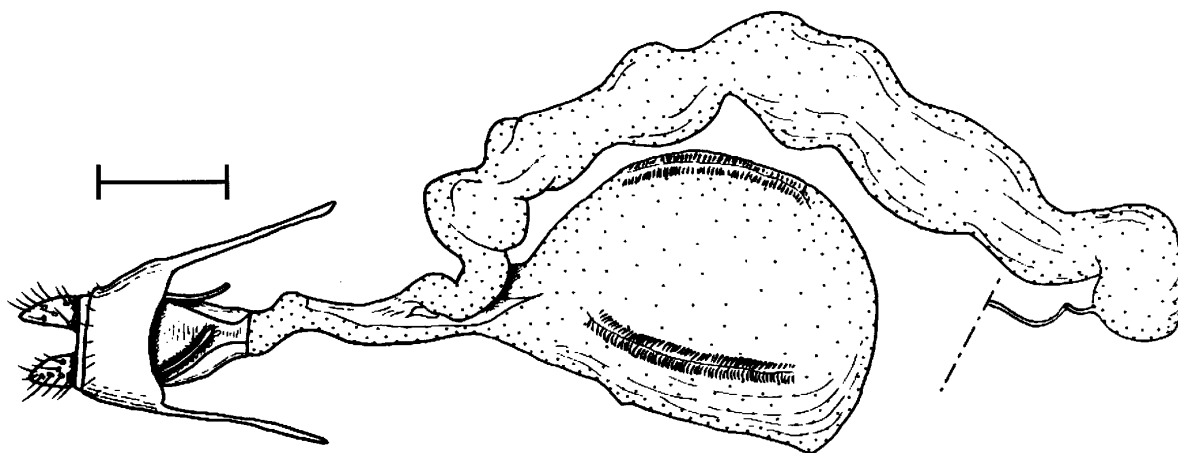


Fig. 9. Female genitalia of *Helicoverpa sugii* Yoshimatsu, sp. nov. Scale 1 mm.

Female genitalia (Fig. 9). Very similar to those of *H. zea*.

Type Series. Holotype. ♂, Komagari, Chichi-jima, 20. v. 1996, K. Takeuchi. Paratypes. 1 ♀, Chichi-jima, iv. 23. 1968, H. Hasegawa, S. Shimizu, T. Saigusa & T. Suetsugu; 1 ♀, Omura, Chichi-jima, 21. i. 1971, S. Kubota, genitalia slide SS-2744; 1 ♂, same locality, 9. iii. 1975, T. Asami, genitalia slide SS-2760; 1 ♀, Okumura, Chichi-jima, 12. vii. 1975, T. Asami; 1 ♀, Chichi-jima, 27. v. 1996, T. Ohbayashi; 1 ♂, Komagari, Chichi-jima, 22. xi. 1995, K. Takeuchi, genitalia slide SS-7738; 1 ♀, same locality, 11. xii. 1995, K. Takeuchi, genitalia slide SS-7737; 1 ♂, same locality, 12. i. 1996, T. Ohbayashi; 1 ♂, same locality, 14. ii. 1996, K. Takeuchi; 1 ♂ 2 ♀, same locality, 20. ii. 1996, K. Takeuchi; 1 ♀, same locality, 2. iii. 1996, K. Takeuchi; 1 ♀, same locality, 10. iii. 1996, K. Takeuchi; 1 ♀, same

locality, 15. iii. 1996, K. Takeuchi; 1 ♀, same locality, emerged 1. iv. 1996, K. Takeuchi; 1 ♀, same locality, 6. iv. 1996, K. Takeuchi; 1 ♀, same locality, 22. v. 1996, K. Takeuchi; 1 ♂, same locality, 28. ii. 1997, T. Ohbayashi; 1 ♂, same locality, 4. iii. 1997, T. Ohbayashi; 1 ♂, same locality, 18. i. 1998, K. Takeuchi; 1 ♀, same locality, 12. vi. 2001, T. Ohbayashi; 1 ♀, Kiyose, Chichi-jima, 28. v. 1996, K. Takeuchi, 1 ♀, same locality, 13. i. 1997, T. Ohbayashi.

Type depository. Holotype is preserved in NIAES and paratypes are deposited in NIAES and OSBTMAES.

Distribution. Haha-jima and Chichi-jima of the Ogasawara Islands.

Bionomics. From the females collected in February and March by the second author, many eggs (see Fig. 3) were obtained, and were experimentally reared on 11 species of plants. Only the larvae reared on *Medicago lupulina* L. grew successfully, and two of them pupated and one of them became an adult moth. As this plant is an exotic one introduced from Europe, it is likely that a natural host plant of this species exists other than this one. This moth flies from January to May (resting posture of adult is shown in Fig. 4). The body and head colors of the last instar larvae are variable, showing green, whitish gray and sometimes red as in Figs 5–7.

Remarks. On the basis of male and female genitalia, Hardwick (1965) recognized five species groups within *Helicoverpa*, viz. the *punctigera*-, *gelotopoeon*-, *hawaiiensis*-, *armigera*- and *zea*-groups. This new species is considered to belong to the *zea*-group because of the following genitalic characters: the vesica terminates apically in a normal coil and the spines on the coils of vesica are of various sizes and similarly arranged on the coil; the basal pouch of the vesica is provided with three dorso-lateral diverticula, of which the median is the smallest; in the female genitalia, the dorsal sclerotization at the base of the appendix bursae is slender, etc.

The following eight species distributed in both the Old and New Worlds were considered to be members of the *zea*-group by Hardwick (1965). *H. zea* (Boddie, 1850) is a notorious pest of vegetables and crops in North and South America and *H. assulta* is also known as a pest in Africa, Asia to Australia. Besides these two pests, there are two African species, *H. fletcheri* Hardwick, 1965 and *H. toddi* Hardwick, 1965, and one Asian species, *H. tibetensis* Hardwick, 1965. Three other species are known from the Oceanic Islands, i. e., *H. confusa* Hardwick, 1965 on the larger eastern islands of the Hawaiian Chain, *H. minuta* Hardwick, 1965 on Lisiansky Island and *H. pacifica* Hardwick, 1965 on Jarvis Island. *H. hardwicki* Matthews, 1999, described from Australia should be included in this group.

The female genitalia of the new species are very similar to those of *H. zea*. However, the characteristics of the valva and situation of the cornuti on the vesica of the new species are different from the other nine species, and the forewing maculation of the new species is also quite different in this group.

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摘 要

Helicoverpa sugii sp. nov. クロタバコガ (新称) の小笠原諸島からの記載と簡単な生態の報告 (鱗翅目, ヤガ科, タバコガ亜科) (吉松 慎一・竹内 浩二)

Helicoverpa 属は全世界の熱帯から温帯地域にかけて 20 種が知られている。広域分布種もいるが, 中には太平洋上の海洋島の特産種も含む。本属の単系統性は, 成虫の形態的な特徴と DNA の塩基配列から強く支持される。すなわち, 雄交尾器はコイル状に巻いた cornuti を備えた vesica を持つこと, 雌交尾器は革状の appendix bursae を備えるという synapomorphy (共有派生形質) がある (Matthews, 1999)。

他方, これまで日本からはタバコガ亜科には 9 種が知られており, その内 *Helicoverpa* 属の種としては, *H. assulta* タバコガと *H. armigera* オオタバコガの 2 種害虫が知られていた。多くの *Helicoverpa* 属の種の前翅は黄色, 茶色となるが, ここで報告する小笠原産の *Helicoverpa* 属の 1 種は黒色の前翅を持ち, オーストラリア産の *H. prepodes* では前翅は灰色となる。また, *H. armigera* オオタバコガとオーストラリア産の *H. punctigera* では黒色型の成虫が生じることがある。しかし, この小笠原産の *Helicoverpa* 属の 1 種はこれら同属の黒色あるいは灰色の前翅を備える種とは雌雄交尾器形態で識別できるので, ここで新種として記載した。柳田・中島 (1999) は本種を, *Helicoverpa* sp. クロタバコガ (杉氏仮称) として小笠原から報告しているが, ここではその和名をそのまま活かしたいと思う。また, 終齢幼虫と卵の写真を初めて図示した。終齢幼虫は, *H. armigera* オオタバコガと同様, 体色の変異が大変大きかったが色彩が幾分異なるようだ。採集した母蛾より採卵し, 試験的に 11 種の植物で飼育してみたところ, マメ科コメツブウマゴヤシ *Medicago lupulina* L. でうまく飼育でき, 2 頭が蛹化し, うち 1 頭が羽化した。コメツブウマゴヤシは欧州原産であるので, 実際の食草は別にあるはずである。小笠原諸島ではタバコガ, オオタバコガ, クロタバコガの *Helicoverpa* 属 3 種が同所的に棲息している。

Hardwick (1965) は雌雄交尾器形態に基づいて *Helicoverpa* 属に *punctigera*, *gelotopoeon*, *hawaiensis*, *armigera*, *zea* の 5 つの種群を認めた。本報告で記載したクロタバコガはこのうち *zea* グループに所属すると考えられるが, 本グループには Hardwick (1965) により以下の 8 種が認められた。このグループの中で, *H. zea* は南北アメリカ大陸に分布する著名な害虫で, また *H. assulta* タバコガはアフリカからアジア, オーストラリアにかけて広域に分布する害虫である。他に, アフリカには *H. fletcheri* と *H. toddi* を産し, アジアからは *H. tibetensis* が知られる。残りの 3 種が太平洋上の諸島の固有種で, ハワイ東部の諸島には *H. confusa*, リジアンスキー島 (ハワイの西端) には *H. minuta*, ジャルビス島 (ホノルルの南約 2,000 km) には *H. pacifica* を産する。また最近オーストラリアから記載された *H. hardwicki* も本グループの一員だと考えられる。クロタバコガは, ♀ 交尾器形態は *H. zea* に酷似しているものの, ♂ 交尾器は valva の形態や vesica 上の cornuti の形状等が本グループの他の種とは異なる。

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